

August 12, 2019

TO: Laurie Niewolny
Water Quality Program, Southwest Regional Office (SWRO)

FROM: Susannah Edwards
Toxics Cleanup Program, Headquarters Office

SUBJECT: 2018 Closure Monitoring Results for Cooke Aquaculture Pacific Net Pen Site 2 in Deepwater Bay, Puget Sound (NPDES Waste Discharge Permit No. WA-003157-7)

The Toxics Cleanup Program (TCP) has reviewed the draft final closure monitoring report and supplemental documentation submitted by Cooke Aquaculture on April 9, 2019 for Net Pen Site 2 in Deepwater Bay. Based on the information presented in Cooke's submittal, TCP supports the termination of the National Pollutant Discharge Elimination System (NPDES) permit and the associated Sediment Impact Zone (SIZ) for the Site 2 facility. TCP's recommendation is dependent upon acceptable completion of quality assurance/quality control of the submitted data by the permittee's third party reviewer (see Chapter 9, page 1 of the Permit Writer's Manual). A summary of the report's major findings is provided in the following paragraphs.

In 2017, Cooke Aquaculture notified Ecology of its intent to cease salmon-rearing operations at the Deepwater Bay Site 2 Net Pen Facility. Per the "Marine finfish rearing facilities" section of the Sediment Management Standards (SMS; WAC 173-204-412), Cooke Aquaculture is required to complete closure monitoring sampling in the vicinity of the former net pen facility to verify and document the recovery of sediment quality to baseline conditions. In July 2018, contractors to Cooke Aquaculture (Rensel Associates Aquatic Sciences Consultants and Gravity Marine Services) collected sediment samples and video footage/photos of sediment conditions to fulfill the requirements of the SMS and NPDES Waste Discharge Permit No. WA-003157-7. Closure monitoring data were collected and analyzed according to the Sampling and Analysis Plan (SAP) that Cooke submitted, and Ecology approved, in June 2018. Due to the structural and catastrophic failure of the net pen facility during the summer of 2017, Ecology required Cooke to collect sediment samples beyond the permitted SIZ, in addition to samples at the perimeter of the SIZ. Ecology also required video documentation of the sea bottom along transects between Net Pen Sites 1 and 2. Samples collected from the perimeter of the SIZ were to be analyzed for grain size, total organic carbon (TOC) concentrations, zinc concentrations and benthic infauna abundance. Outside the SIZ, sediment samples were to be analyzed for grain size, and TOC and zinc concentrations. The closure monitoring submittal package included:

- A report titled: "NPDES Permit Closure and Exceedance Monitoring in 2018: Cooke Aquaculture Pacific Net-Pen Sites 1 and 2 in Deepwater Bay, Puget Sound," prepared by Rensel Associates Aquatic Sciences Consultants.
- A supporting document to the above report with the subject line: "Response to requested comments regarding benthic infauna indicator species used for aquaculture and issues related to reference areas," prepared by Rensel Associates Aquatic Sciences Consultants.
- Continuous video footage of the sea bottom along transect lines between Deepwater Bay Sites 1 and 2 (the area where the net pen drifted after structural/anchor failure), collected by Rensel Associates Aquatic Sciences Consultants and Gravity Marine.
- Photos of the sediment grab samples and sediment conditions at each of the sampling stations, collected by Rensel Associates Aquatic Sciences Consultants and Gravity Marine.

The Toxics Cleanup Program has reviewed the closure monitoring report and a subset of the accompanying photos and videos from the sampling locations outside of, and at the perimeter of the SI2. According to the report, five replicate samples were obtained at each of the anticipated sample stations outside the SI2 (i.e. 21 stations). Due to large quantities of shell and coarse material (e.g. cobble), only two of the five locations at the perimeter of the SI2 were sampled. At one of these locations, the consultant was able to obtain only three replicates due to sediment conditions (abundant shell prevented sampler from closing properly). A total of 23 stations were sampled for Site 2 closure monitoring.

Data presented in the report indicate that all stations sampled contained zinc concentrations below the SMS sediment cleanup objective (410 mg/kg dry weight) and cleanup screening level (960 mg/kg dry weight) for zinc. All stations were also analyzed for TOC and compared to the baseline TOC value for Site 2 of 0.76%, which was the criterion established in the SAP. All but two of the stations sampled met the criteria (no significant difference from baseline conditions; t-test, $p \leq 0.05$). Of note, the two stations that failed to meet the Site 2 TOC criterion contained higher percentages of fines, and when compared to the Site 1 baseline station, where higher percentages of fines were also documented, did not result in a significant difference (Site 1 baseline TOC value was 0.90%).

Sediment was collected for benthic infauna analysis at one perimeter location at Site 2. The report states that sediment could not be successfully collected for benthic abundance at the four other stations where this analysis was anticipated to occur. At the station where benthic abundance analysis was performed, the report states that, "analysis of numerically dominant species or taxa indicated the prevalence of non-commercial clams that are either species normal for the area or indicators of sensitive [conditions] after organic enrichment subsides. Known Puget Sound benthic infauna indicator species indicate no dominance of pollution-tolerant species but rather dominance of sensitive species. Results were compared to a similar evaluation in 1994 and 1995 and found to be consistent."

All sediment grab-samples were also inspected for indicators of organically-enriched and anoxic surface sediment conditions including the presence of an apparent redox potential discontinuity black layer, the presence of hydrogen sulfide odor, and the presence of *Beggiatoa* sp., sulfur-reducing bacteria. The report states there were no explicit indications of sediment eutrophication. TCP's review of a subset of photos and video transects, as well as on-site observations during one of the sampling days, did *not* reveal obvious signs of eutrophication/anoxic surface sediment conditions.

Based on the information presented in the report, the documentation in the supplemental videos and photos, and on my in-person observations during one of the sampling days, it appears that sediment quality has returned to background conditions and does not require further sediment monitoring.

Please contact me if you have any questions or concerns regarding the contents of the closure monitoring submittal and/or TCP's review of this information.

Thank you,

Susannah Edwards
Sediment Cleanup Specialist